

【Table 1】

No.	alloy composition (wt%)			metal construction		
	Cu	Si	Pb	Zn	phases	$\gamma + \kappa + \mu$ (%)
1001	74.8	2.9	0.03	remainder	$\alpha + \gamma + \kappa$	25
1002	74.1	2.7	0.21	remainder	$\alpha + \gamma + \kappa$	20
1003	78.1	3.6	0.10	remainder	$\alpha + \kappa + \mu$	65
1004	70.6	2.1	0.36	remainder	$\alpha + \beta + \gamma$	10
1005	74.9	3.1	0.11	remainder	$\alpha + \gamma + \kappa$	30
1006	69.3	2.3	0.05	remainder	$\alpha + \beta + \gamma$	10
1007	78.5	2.9	0.05	remainder	$\alpha + \kappa + \mu$	25

【Table 2】

No.	alloy composition (wt%)						metal construction	
	Cu	Si	Pb	Bi	Te	Se	Zn	phases
2001	73.8	2.7	0.05	0.03			remainder	$\alpha + \gamma + K$
2002	69.2	2.0	0.33	0.27			remainder	$\alpha + \beta + \gamma + K$
2003	74.5	2.8	0.03		0.31		remainder	$\alpha + \gamma + K$
2004	78.0	3.6	0.12		0.05		remainder	$\alpha + \gamma + K + \mu$
2005	76.2	3.2	0.05			0.33	remainder	$\alpha + \gamma + K + \mu$
2006	72.9	2.6	0.24			0.06	remainder	$\alpha + \gamma + K$

【Table 3】

No.	alloy composition (wt%)						metal construction	
	Cu	Si	Pb	Al	P	Zn	phases	$\gamma + \kappa + H$ (%)
3003	78.8	2.5	0.15	3.4		remainder	$\alpha + \gamma + \kappa$	55
3004	74.9	2.7	0.09	1.2		remainder	$\alpha + \gamma + \kappa$	35
3006	74.8	2.8	0.18		0.03	remainder	$\alpha + \gamma + \kappa$	25
3007	76.5	3.3	0.04		0.21	remainder	$\alpha + \gamma + \kappa + H$	45
3009	74.9	2.0	0.35	2.7	0.13	remainder	$\alpha + \beta + \gamma + \kappa$	40

【Table 4】

No.	alloy composition (wt%)									metal construction	
	Cu	Si	Pb	Al	P	Bi	Te	Se	Zn	$\alpha + \beta + \gamma + \kappa$	$\gamma + \kappa + \mu$ (%)
4002	74.5	2.6	0.11	1.5		0.04			remainder	$\alpha + \beta + \gamma + \kappa$	30
4004	76.8	3.2	0.05		0.03	0.31			remainder	$\alpha + \gamma + \kappa + \mu$	40
4006	75.5	1.9	0.32	3.2	0.15	0.16			remainder	$\alpha + \beta + \gamma + \kappa$	40
4009	79.1	2.7	0.15	3.4			0.05		remainder	$\alpha + \gamma + \kappa + \mu$	60
4010	74.5	2.8	0.10		0.05		0.05		remainder	$\alpha + \gamma + \kappa$	25
4012	76.8	2.8	0.05	2.0	0.03		0.13		remainder	$\alpha + \gamma + \kappa$	45
4016	76.1	2.5	0.07	2.3				0.10	remainder	$\alpha + \beta + \gamma + \kappa$	40
4018	74.0	2.5	0.23		0.22			0.03	remainder	$\alpha + \gamma + \kappa$	20
4020	75.3	2.7	0.22	1.4	0.03			0.05	remainder	$\alpha + \gamma + \kappa$	35

【Table 5】

No.	alloy composition (wt%)						metal construction	
	Cu	Si	Pb	P	Sb	As	Zn	phases
5003	74.8	2.8	0.03	0.08			remainder	$\alpha + \gamma + k$
5004	78.2	3.4	0.16	0.21			remainder	$\alpha + \gamma + k$
5005	74.9	3.1	0.09		0.07		remainder	$\alpha + \gamma + k$
5006	72.2	2.4	0.25			0.13	remainder	$\alpha + \gamma$
5013	74.5	2.7	0.05	0.03	0.12		remainder	$\alpha + \gamma + k$
5014	76.1	3.1	0.14	0.18	0.03		remainder	$\alpha + \gamma + k + \mu$
5015	73.9	2.5	0.08	0.07		0.05	remainder	$\alpha + \gamma + k$
5016	74.5	2.8	0.07			0.08	remainder	$\alpha + \gamma + k$

【Table 6】

No.	alloy composition (wt%)								metal construction	
	Cu	Si	Pb	Bi	P	Sb	As	Zn	phases	$\gamma + \kappa + \mu$ (%)
6009	77.0	3.1	0.14	0.06	0.21			remainder	$\alpha + \kappa + \mu$	40
6010	72.5	2.5	0.07	0.09	0.05	0.03		remainder	$\alpha + \gamma$	20
6011	74.7	2.9	0.10	0.32	0.14		0.10	remainder	$\alpha + \gamma + \kappa$	30
6012	71.4	2.3	0.25	0.14	0.07	0.03	0.02	remainder	$\alpha + \gamma$	15
6013	74.7	3.0	0.13	0.05		0.12		remainder	$\alpha + \gamma + \kappa$	30
6014	77.2	3.2	0.27	0.23			0.04	remainder	$\alpha + \kappa + \mu$	45
6015	74.0	2.8	0.07	0.03			0.03	remainder	$\alpha + \gamma + \kappa$	25

【Table 7】

No.	alloy composition (wt%)								metal construction		
	Cu	Si	Pb	Te	Se	P	Sb	As	Zn	phases	$\gamma + \kappa + \mu$ (%)
6024	74.6	2.8	0.05	0.08		0.19			remainder	$\alpha + \gamma + \kappa$	25
6025	78.5	3.7	0.22	0.25		0.23	0.03		remainder	$\alpha + \kappa + \mu$	65
6026	74.9	2.9	0.16	0.05		0.05		0.10	remainder	$\alpha + \gamma + \kappa$	30
6027	73.8	2.5	0.07	0.03		0.06	0.02	0.04	remainder	$\alpha + \gamma + \kappa$	20
6028	74.8	2.6	0.12	0.02			0.12		remainder	$\alpha + \gamma + \kappa$	20
6029	74.2	2.8	0.37	0.10			0.11	0.02	remainder	$\alpha + \gamma + \kappa$	25
6030	76.3	3.2	0.08	0.05				0.07	remainder	$\alpha + \gamma + \kappa + \mu$	35
6039	71.9	2.4	0.12		0.17	0.04			remainder	$\alpha + \gamma$	20
6040	77.0	3.5	0.03		0.35	0.23	0.03		remainder	$\alpha + \kappa$	50

【Table 8】

No.	alloy composition (wt%)								metal construction	
	Cu	Si	Pb	Se	P	Sb	As	Zn	phases	$\gamma + \kappa + \mu$ (%)
6041	74.7	2.9	0.07	0.12	0.06		0.03	remainder	$\alpha + \gamma + \kappa$	25
6042	72.8	2.5	0.20	0.06		0.03		remainder	$\alpha + \gamma$	20
6043	78.0	3.7	0.33	0.15		0.02	0.10	remainder	$\alpha + \kappa + \mu$	65
6044	74.0	2.8	0.12	0.05			0.08	remainder	$\alpha + \gamma + \kappa$	25
6045	76.1	3.1	0.05	0.07	0.03	0.09	0.03	remainder	$\alpha + \gamma + \kappa$	30

【Table 10】

No.	alloy composition (wt%)						metal construction	
	Cu	Si	Pb	Al	Mn	Zn	phases	$\gamma + \kappa + \mu$ (%)
7018	72.4	3.5	0.08	1.5	1.1	remainder	$\alpha + \beta + \gamma + \kappa$	45
7018a								
7019	69.2	3.9	0.03	0.4	3.1	remainder	$\alpha + \beta + \gamma$	25
7019a								
7020	76.6	4.3	0.14	2.3	1.9	remainder	$\alpha + \beta + \gamma + \kappa$	65
7020a								

【Table 9】

Copper Alloys No.	alloy composition (wt%)						Shapy Impact Value (J/cm)
	Cu	Si	Pb	Sn	P	Zn	
1	75.1	2.8	0.06	--	--	Remainder	59.10
2	75.0	2.6	0.06	1.07	--	Remainder	12.20
3	75.3	2.7	0.05	--	0.11	Remainder	63.00
4	76.7	3.0	0.06	--	--	Remainder	73.40
5	77.0	3.0	0.05	1.00	--	Remainder	9.90
6	77.1	3.1	0.05	--	0.10	Remainder	63.40